APPLICABLE PRODUCTS
These practices apply to all Bosch IP cameras installed outdoors, especially if the location has a high incidence of lightning strikes.

OVERVIEW
This drawing is an overview of the correct installation to provide the optimum Lightning and Surge protection for an outdoor installation.

WIRING/CABLING
- **All cables** must be in metal grounded conduit. (Earth grounded across the entire span).
  - Power and signal cables must be in separate conduits.
- **Ethernet cables** must be a minimum of an overall braided Shield (S) with Unscreened Twisted Pairs (S/UTP), either Cat 5e or Cat 6.
  - The S/UTP cable should be grounded at both ends.
    - Bosch network cameras for outdoor installations, such as the VG5 7000 series Autodomes are internally protected against power surges and transients. But this requires the use of a grounded shield to ensure a path for the power surge to reach ground.
  - Don’t exceed a cable length of 100 m (328 ft).
  - The following shielding methods provide additional protection for challenging installations.
    - SF/UTP, has both an overall braided shield (S) and a foil shield (F) with unscreened twisted pairs (UTP). This cable is very effective at preventing EMI from entering or exiting the cable.
    - S/FTP has an overall braided shield (S) with foil screened twisted pairs (FTP). The additional foil on individual pairs limits the amount of crosstalk between the pairs.
      - All Category 7 cables are S/FTP.
• **Additional wiring guidelines**
  o Maintain the separation distance between the Ethernet cable and high voltage/EMF.

<table>
<thead>
<tr>
<th>Voltage Range</th>
<th>Minimum Separation Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td>For less than 600 VAC</td>
<td>50 mm (2 in)</td>
</tr>
<tr>
<td>For &gt; 600 VAC &lt; 3 kV</td>
<td>1.5 m (5 ft)</td>
</tr>
<tr>
<td>For &gt; 3 kV</td>
<td>3 m (10 ft)</td>
</tr>
</tbody>
</table>
  o The camera Power Supply Unit (PSU) and the camera housing must be grounded using a separate earth conductor to a building ground or grounded electrode.
  o If a metal pole is being used, also ground the pole to this same electrode.
  o Refer to the local building codes.

**OUTDOOR MIDSPAN**
• Must be compatible with HPoE 4-wire operation.
  o Examples:
    ▪ Bosch VJC-7000-90
    ▪ Microsemi PD-9601GO [http://www.microsemi.com](http://www.microsemi.com)
    ▪ Or Equivalent.
  o Refer to the manufacturer’s installation instructions and local building codes.

**SURGE PROTECTION**
• Lightning rod and electrode
  o (Refer to NFPA 780, Class 1 & 2, UL96A, or the equivalent code appropriate for the country/region).
  o Also refer to the manufacturer’s installation instructions and local building codes.
  • Must install surge protectors at the cable entrance into the building and at the camera.
  o Refer to the manufacturer’s installation instructions and local building codes
  o Must be compatible with HPoE 4-wire operation.
    ▪ Examples:
      ▪ ITW Linx CAT6-75/P OE RJ45 [http://www.itwlinx.com](http://www.itwlinx.com/)
      ▪ Microsemi PD-OUT-SP11
      ▪ Or equivalent.
  o Refer to the manufacturer’s installation instructions and local building codes.